

0071

Incoming OK  
C0410002  
Task 2583

**From:** "Davis, Mike" <MDavis@archcoal.com>  
**To:** "May, Ken" <KMay@archcoal.com>, "Hansen, Chris" <CHansen@archcoal.com>, "Byars, John" <JByars@archcoal.com>, "Hedberg, Wayne" <waynehedberg@utah.gov>, "Fluke, Steve" <stevefluke@utah.gov>, "Hess, Pete" <petehess@utah.gov>, <twlloyd@fs.fed.us>, <mnyman@fs.fed.us>, <James\_Kohler@blm.gov>, <sperkes@blm.gov>, <steve\_rigby@blm.gov>  
**Date:** 7/17/2006 12:34:57 PM  
**Subject:** Sufco North Water Spring Plan

Attached is a scanned copy of the Sufco Permit Modification for an investigation plan for the Pines 105, 310, 311 and Joes Mill Pond spring areas. This scanned copy is being emailed out to help everyone start reviewing the plan. Sufco will mail out the hard copies of the permit modification as soon as we can make other arrangements

to get the DOGM Form C1 notarized since one of our two notarizes is off recovering from surgery and the other one is on vacation.

Sufco would like to start as soon as possible and the prospective driller has indicated he could start on the 31st but if we miss that week, then we would need to wait until the 14th. Sufco will be mining past the North Water Pines 105 spring area the middle of August and the Pines 310 & 311 spring area the first part of September. If we want to collect meaningful data the drilling needs to be done before the middle of August.

Please review and approve this amendment as soon as possible. If you have any questions or need additional information, please contact Chris Hansen at (435) 448-2669 or me at (435) 286-4421.

Thanks,

Mike Davis

\*\*\*\*\* Email Disclaimer \*\*\*\*\*

The information contained in this e-mail, and in any accompanying documents, may constitute confidential and/or legally privileged information. The information is intended only for use by the designated recipient. If you are not the intended recipient (or responsible for delivery of the message to the intended recipient), you are hereby notified that any dissemination, distribution, copying, or other use of, or taking of any action in reliance on this e-mail is strictly prohibited. If you have received this e-mail communication in error, please notify the sender immediately and delete the message from your system.



Canyon Fuel  
Company, LLC.  
Sufco Mine

A Subsidiary of Arch Western Bituminous Group, LLC.

Ken May, General Manager  
397 South 800 West  
Salina, UT 84654  
(435) 286-4400 - Office  
(435) 286-4499- Fax

July 17, 2006

D. Wayne Hedberg  
Permit Supervisor  
Utah Coal Regulatory Program  
Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
P. O. Box 145801  
Salt Lake City, Utah 84114-5801

Re: Permit Modification to Include an Investigation Plan for the Pines 105, 310, 311  
and Joes Mill Pond Spring Areas, Canyon Fuel Company, LLC, SUFCO Mine  
C/041/002

Dear Wayne:

Please find enclosed with this letter eight copies of a permit modification to include an investigation plan for the Pines 105, 310, 311 and Joes Mill Pond spring areas and modification to the plan's water monitoring schedule to include the monitoring of the Pines 310 and 311 springs. This submittal is being made in part to satisfy the requirements of the May 22, 2006 Findings of Material Damage letter forwarded to Sufco.

Please note the permit modification includes information regarding reporting the results of the investigation and monitoring of the water levels within the completed piezometers and wells. The data collected from the investigation will be used to make determinations if this proposed project is adequate to formulate final mitigation plans for the spring areas or if more investigation will be necessary in the early summer of 2007. Sufco will submit a report detailing the results of the investigation and water monitoring by the end of January 2007. At that time, we will request a meeting with the Division to discuss the results and the future plans and schedule for mitigation of the spring sites.

If you have any questions or need additional information, please contact Chris Hansen at (435) 448-2669 or Mike Davis at (435) 286-4421.

Permit Supervisor  
Utah Coal Regulatory Program  
July 17, 2006  
Page 2

Sincerely,  
CANYON FUEL COMPANY, LLC  
SUFCO Mine

  
Kenneth E. May  
General Manager

Encl.

KEM/MLD:kb

cc: DOGM Price Office  
Tom Lloyd - Manti-LaSal National Forest  
DOGM Correspondence File

sufpub\govt2006\dogmmrp\North Water Mitigation.ltr.doc

## APPLICATION FOR COAL PERMIT PROCESSING

Permit Change ☒ New Permit ☐ Renewal ☐ Exploration ☐ Bond Release ☐ Transfer ☐

Permittee: CANYON FUEL COMPANY, LLC

Mine: SUFCON MINE

Permit Number: C/041/002

Title: North Water Spring Plan

Description, Include reason for application and timing required to implement:

Need approval as soon as possible to implement this plan end of July or first part of August.

Instructions: If you answer yes to any of the first eight (gray) questions, this application may require Public Notice publication.

- ☐ Yes ☒ No 1. Change in the size of the Permit Area? Acres: \_\_\_\_\_ Disturbed Area: \_\_\_\_\_ ☐ increase ☐ decrease.
- ☐ Yes ☒ No 2. Is the application submitted as a result of a Division Order? DO# \_\_\_\_\_
- ☐ Yes ☒ No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- ☐ Yes ☒ No 4. Does the application include operations in hydrologic basins other than as currently approved?
- ☐ Yes ☒ No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- ☐ Yes ☒ No 6. Does the application require or include public notice publication?
- ☐ Yes ☒ No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- ☐ Yes ☒ No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- ☐ Yes ☒ No 9. Is the application submitted as a result of a Violation? NOV # \_\_\_\_\_
- ☐ Yes ☒ No 10. Is the application submitted as a result of other laws or regulations or policies?

Explain: \_\_\_\_\_

- ☐ Yes ☒ No 11. Does the application affect the surface landowner or change the post mining land use?
- ☐ Yes ☒ No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- ☐ Yes ☒ No 13. Does the application require or include collection and reporting of any baseline information?
- ☒ Yes ☐ No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- ☐ Yes ☒ No 15. Does the application require or include soil removal, storage or placement?
- ☐ Yes ☒ No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- ☐ Yes ☒ No 17. Does the application require or include construction, modification, or removal of surface facilities?
- ☒ Yes ☐ No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- ☒ Yes ☐ No 19. Does the application require or include certified designs, maps or calculation?
- ☐ Yes ☒ No 20. Does the application require or include subsidence control or monitoring?
- ☐ Yes ☒ No 21. Have reclamation costs for bonding been provided?
- ☐ Yes ☒ No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- ☐ Yes ☒ No 23. Does the application affect permits issued by other agencies or permits issued to other entities?

Please attach four (4) review copies of the application. If the mine is on or adjacent to Forest Service land please submit five (5) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

KENNETH E. MAY, MINE MANAGER

Print Name

Sign Name, Position, Date

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Notary Public

My commission Expires: \_\_\_\_\_, 20\_\_\_\_

Attest: State of \_\_\_\_\_ ) ss:  
County of \_\_\_\_\_

For Office Use Only:

Assigned Tracking  
Number:

Received by Oil, Gas & Mining

## Detailed Schedule Of Changes to the Mining And Reclamation Plan

Permit Number: C/041/022

Provide a detailed listing of all changes to the Mining and Reclamation Plan, which is required as a result of this proposed permit application. Individually list all maps and drawings that are added, replaced, or removed from the plan. Include changes to the table of contents, section of the plan, or other information as needed to specifically locate, identify and revise the existing Mining and Reclamation Plan. Include page, section and drawing number as part of the description.

Replace pages 7-vii, 7-42, 7-43 and 7-51F in Chapter 7, Volume 2 of MRP.

**Add new pages 7-51G and 7-51H in Chapter 7, Volume 2 of MRP.**

Plate 7-3 in Chapter 7, Volume 2 of MRP.

Add New Appendix 7-22 in Volume 11 of MRP.

\_\_\_\_\_

\_\_\_\_\_

---

---

---

---

---

---

---

---

---

---

---

---

[illegible]

---

© 2006 The Authors  
Journal compilation © 2006 Blackwell Publishing Ltd

bioRxiv preprint doi: <https://doi.org/10.1101/2019.05.20.246400>; this version posted May 20, 2019. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

---

\_\_\_\_\_

© 2006 The Authors  
Journal compilation © 2006 Blackwell Publishing Ltd

Received by Oil, Gas &amp; Mining

**LIST OF APPENDICES** (Continued)  
(Appendices appear in Volumes 9 and 10)

Appendix

- 7-20 Investigation of Surface and Groundwater Systems in the SITLA Muddy Tract Area, Sevier County, Utah: Probable Hydrologic Consequences of Coal Mining in the SITLA Muddy Tract and Recommendations for Surface and Groundwater Monitoring
- 7-21 Muddy Tract Hydrologic Baseline Data (Includes SITLA Tract baseline data)
- 7-22 Investigation Plan for Springs Pines 105, Joes Mill Pond, Pines 310, and 311

**TABLE 7-2 (Continued)**  
**Water Monitoring Program**

<u>Springs</u>	<u>Protocol</u>	<u>Comments</u>
SUFCA 001	D,3	Blackhawk Formation
SUFCA 047	D,4	Star Point Sandstone
SUFCA 057A	D,3	North Horn Formation
SUFCA 089	E,3	Castlegate Sandstone
GW-13	D,3	North Horn Formation
GW-20	D,5	Castlegate Sandstone
GW-21	D,3	Castlegate Sandstone
Pines 100	D,4	Castlegate Sandstone
Pines 105	D,3	Castlegate Sandstone
Pines 206	D,5	Blackhawk Formation
Pines 209	D,5	Blackhawk Formation
Pines 212	D,5	Blackhawk Formation
Pines 214	D,5	Blackhawk Formation
Pines 218	D,3	Castlegate Sandstone
Pines 303	D,3	Blackhawk Formation
Pines 310	D,7	Castlegate Sandstone
Pines 311	D,7	Castlegate Sandstone
Link Portal-West	D,4	Link Canyon Portal
Link Portal-East	D,4	Link Canyon Portal
M-SP01	D,3	Price River Formation
M-SP02	D,3	Price River Formation
M-SP08	D,3	North Horn Formation
M-SP18	D,3	Price River Formation
M-SP39	D,3	Price River Formation
M-SP53	D,3	North Horn Formation

**TABLE 7-3**  
**Field and Laboratory Measurement Protocol**

**Water level and flow measurements**

- A Monitoring well: quarterly water level measurement
- B Monitoring well: annual water level measurement (3rd quarter)
- C Stream: quarterly discharge measurements
- D Spring: quarterly discharge measurements
- E Spring Pool: quarterly water level measurement
- F Stream: weekly measurements in 1999 June through October, thereafter monthly July through October.
- G Stream: identify perennial portion of stream on or near October 1 of each year.

**Water quality**

- 1 Stream: quarterly surface water quality field measurements
- 2 Stream: quarterly surface water quality operational laboratory measurements
- 3 Spring: quarterly groundwater quality field measurements
- 4 Spring: quarterly groundwater quality operational laboratory measurements
- 5 Spring: groundwater quality operational laboratory measurements quarterly for two (2) years, then reverting to quarterly water quality field measurements
- 6 Stream: flow measurements only, no water quality samples required.
- 7 Spring: initially ground water field measurements June 2006 through December 2006 as accessible then quarterly groundwater field measurements thereafter.



A copy of the October 2003 "Monitoring and Mitigation Plan for Mining Under the East Fork of Box Canyon" prepared by the Division and reviewed and accepted by the Forest with some modifications has been included in Appendix 3-10. The preceding paragraphs have been prepared based on this plan. Sufco will meet all of the monitoring and mitigation responsibilities described in the plan as it pertains to the undermining of the East Fork of Box Canyon.

Springs Pines 310 and Pines 311, located in the east fork (North Water Fork) of the East Fork of Box Canyon, were added to the water monitoring list in July 2006. Initially, these springs have been monitored monthly since June 2006 and will continue to be monitored monthly through December 2006, or as accessible, for field water quality parameters and flow. After December 2006, these sites will be monitored on a quarterly basis for field water quality and flow. The flow from Pines 310 spring area is measured at a point where the majority of the spring area flow coalesce into a channel a few hundred feet north and west of the initial spring discharge area. Field water quality parameters are monitored at one of the points where ground water is discharging from the Castlegate Sandstone. Pines 311 is monitored at the western most point of where ground water is discharging from the outcrop in this spring area.

#### Pines 105, Joes Mill Pond, Pines 310, and Pines 311 Investigation

The Pines 105 and Joes Mill Pond springs were undermined during the winter of 2005-2006 as Sufco extracted coal from panel 5LPE. In the spring of 2006, Sufco discovered surface discharge of ground water at these locations appeared to have ceased as the area was subsided. The Division concluded that Sufco had caused material damage to the spring areas and required the mine to prepare and submit a plan to restore the spring areas. Initially, Sufco hauled sufficient water to livestock in the area to replace that which was lost when the springs stopped flowing at the surface. In July, Sufco submitted a plan to investigate the effected spring areas and a copy of the investigation plan is included in Appendix 7-22.

The purpose of the investigation proposed is three-fold:

1. Determine if ground water discharge in the area of Pines 105 and Joes Mill Pond springs continue to discharge to the alluvium;
2. Monitor and evaluate the effects of mining on the surface and subsurface water in the Pines 310 and Pines 311 spring areas; and
3. Determine the potential for completing and operating ground water wells in the spring areas as part of the spring site mitigation activities.

The piezometers/wells completed as part of this project will be monitored on a bi-weekly basis through December 2006 or as accessible. Transducers with data loggers will be placed in several of the piezometers to record data on a more continuous basis. The monitoring frequency of the piezometers/wells after December 2006 will be dependant upon the results of the drilling investigation and the impacts to springs Pines 310, 311, 105, and the Joes Mill Pond of mining the 6LPE panel in the fall and winter of 2006.

A report detailing the results of the drilling and piezometer/ well installation and completion will be submitted to the Division by the end of October 2006. Water level data collected from the piezometers/wells will be reported to the Division electronically within two weeks at the end of each the month through December 2006. The Division will also be notified within three days via e-mail or telephone of significant changes to ground water elevations in Pines 310, 311, 105 spring areas as the 6LPE longwall panel is mined. A report compiling the water level data and interpretation of the data will be submitted to the Division by the end of January 2007.

Based on the findings of the investigation, Sufco will submit to the Division either additional plans (if water is not found in the Pines 105 and Joes Mill Pond area, additional bedrock drilling may be required to locate a suitable source of ground water) or a final plan for mitigation of the effected spring areas.

#### **7.3.1.3 Acid- and Toxic-Forming Materials**

Results of monitoring of mine discharge, surface, and groundwater, indicate that no impact to these waters from acid- and toxic-forming materials has been found in the permit and adjacent areas (Section 7.2.8.3). Parameters defining acid- and toxic-forming materials continue to be monitored as

described in Volume 3 of this M&RP. In the event that acid- or toxic-forming materials are identified, they will be disposed of in the waste rock disposal area. The treatment of these materials will be handled as indicated in Volume 3 of this M&RP.

#### **7.3.1.4 Transfer of Wells**

Before final release of bond, exploration or monitoring wells will be sealed in a safe and environmentally sound manner in accordance with R645-301-631, R645-301-738, and R645-301-765. Ownership of wells will be transferred only with prior approval of the UDOGM. The conditions of such a transfer will comply with State and local laws. SUFCO will remain responsible for the management of the well until bond release in accordance with R645-301-529, R645-301-551, R645-301-631, R645-301-738, and R645-301-765.

#### **7.3.1.5 Discharges**

## **APPENDIX 7-22**

Investigation Plan for Springs Pines 105,  
Joes Mill Pond, Pines 310, and 311

# INVESTIGATION PLAN FOR SPRINGS PINES 105, JOES MILL POND, PINES 310, AND 311

## Introduction

Spring Pines 105 is located in the southeast quarter of Section 11, Township 21 South, Range 5 East and Joes Mill Pond spring is located in the northeast quarter of Section 14, Township 21 South, Range 5 East (Figure 1). These springs, which have historically been utilized by livestock and wildlife, were undermined in the Winter of 2005-2006 as the Sufco mine advanced the longwall in panel 5 Left Pines East (5LPE). Subsequent to undermining, discharge to the surface from the two springs ceased.

Sufco plans to undermine and/or mine within the vicinity of two additional springs, Pines 310 and 311, while advancing the longwall in panel 6 Left Pines East (6LPE) in the Fall of 2006 (Figure 1). These two springs are located in the southeast quarter of Section 11, Township 21 South, Range 5 East in the same tributary to the East Fork of Box Canyon as Pines 105. Pines 310 actually consists of two springs; one located at the contact of the Castlegate Sandstone and the alluvial fill and the other is located higher on the hill to the east and issues from within the sandstone.

The purpose of this investigation is three-fold:

1. Determine if ground water at Pines 105 and Joes Mill Pond springs continues to discharge to the alluvium;
2. Monitor and evaluate the impacts of mining on the surface and subsurface water in the Pines 310 and 311 spring areas; and
3. Determine the potential for completing and operating ground water wells as a mitigation tool in these areas.

A drilling and monitoring program is proposed as part of this investigation to make the determinations and evaluations as listed above. As part of the drilling program, several auger holes are proposed to be advanced in the alluvium in the spring areas and most will be completed as piezometers and/or ground water wells. Data collected from these piezometers/wells will be used in determining whether additional, more intensive investigative measures are needed to mitigate mining impacts. Additionally, if water is found to still be present in the shallow alluvium, information from the wells will be used to determine the types of mitigation that could be employed to return the water to the surface.

## Drilling and Piezometer/Well Installation Program

### Pines 105 Area

A low-impact, tractor-mounted auger rig will be used to drill up to 15 vertical holes in the alluvium in the area of Pines 105 (Figure 2). Hollow-stem augers with an eight-inch O.D. will be used to drill the holes. Approximately six auger holes will be drilled parallel to the

axis of the channel within the bottom of the canyon (Figure 3). Five of the six holes will be located in close proximity to the fenced spring area while the sixth hole will be drilled several hundred feet downstream of the fenced area. Additionally, two lines of two holes each will be drilled perpendicular to the line of six holes (Figure 3). If water is encountered in the alluvium in the spring area, the majority of the holes will be completed as piezometers using one-inch I.D. PVC casing with an appropriate length of PVC 0.010 slotted screen. Where possible, a filter pack consisting of 10-20 silica sand or equivalent will be placed through the screened interval of the hole and to a point at least 6-inches above the screened interval. A bentonite seal will then be placed from the top of the filter pack to within 12-inches of the ground surface. The PVC piezometer will be cut-off approximately 12-inches above the ground surface and a surface casing consisting of four-inch O.D. PVC pipe will be hydraulically pushed into the ground around the piezometer. A locking cap will be placed on top of the surface casing.

One to two of the drill holes may be completed as four-inch diameter wells completed using PVC pipe and similar screen and filter pack sizes as the completed piezometers. The presence or amount of water present in the alluvium will dictate whether any of the holes are completed as wells. The wells will be completed using approximately six-inch O.D. steel surface casing hydraulically pushed into the ground outside the well casing. A concrete pad with approximate dimensions of 12-inches square by six-inches thick will be poured to hold the surface casing in place. A locking cap will be used to secure the well from vandalism. The completed wells will extend two to three feet above ground surface.

One to three of the drill hole locations may consist of two piezometers completed within close proximity to each other. One of the piezometers will be completed within the upper few feet of the ground water column and the other will be completed near the base of the alluvium within the ground water column. The purpose of these "twined" piezometers is to determine if the groundwater, if present, exhibits an upward or downward flow gradient or if perched groundwater conditions are present.

Additional holes may be drilled in the spring area if the results of the field investigation indicate more information is needed and can be obtained to further characterize the current ground water conditions.

#### Joes Mill Pond

At least three drill holes will be completed in the Joes Mill Pond area (Figure 4). One will be located immediately adjacent to the seep area located on the south side of the valley and the second will be located closer to the center of the canyon floor and the pond area. A third drill hole will be located a short distance downstream of the pond embankment. If water is encountered in these holes, at least two of the three will be completed as piezometers and the third may be completed as a well. The completion techniques employed will be similar to those described above for the piezometers and wells in the Pines 105 area. If water is present and it is deemed feasible or necessary while in the field, a fourth hole may be drilled and completed as a "twin" to one of the piezometers to determine if the ground water encountered exhibits an upward or downward gradient or if perched groundwater conditions are present.

### Pines 310 and 311 Area

Approximately 17 holes may be drilled in the Pines 310 and 311 spring area. At least seven holes will be drilled and completed as piezometers in a line parallel to the axis of the channel in the canyon bottom extending from a point several hundred feet upstream of the Pines 310 spring to a point a few hundred feet downstream of the Pines 311 spring (Figure 3). At least two lines of holes with two holes each will be drilled and completed as piezometers perpendicular to the axis of the seven holes as illustrated on Figure 3. Additionally, one set each of "twinned" piezometers will be completed in the alluvium within close proximity of the spring discharge locations. A third "twinned" location may be completed at one of the piezometer locations between the two springs. As many as two of the drill hole locations may be completed as wells for potential future use in site mitigation. The completion techniques for piezometers and wells will be similar to those employed at Pines 105 and the Joes Mill Pond area.

Proposed accesses to the tributary canyons of the East Fork of Box Canyon in which the spring areas are located are illustrated on Figure 1. Two potential routes are proposed to access the Pines 105 and 310/311 spring areas. Both routes would require the auger rig to leave existing roads to access the bottom of the canyon. Minor amounts of dead fall would need to be moved or cut to allow passage of the rig. Assuming no equipment failures, the number of trips required by the rig on either of these access trail should be limited to two trips in and out. Access to the Joes Mill Pond area would be accomplished by using existing Forest Roads.

Upon completion of the drilling program, all of the drill sites and completed piezometers/wells will be surveyed for elevation and location. The tops of the casing will be surveyed for elevation and the surveyed point marked so that point can be used to determine the elevation of the water measured in the piezometer/well.

### Monitoring Plan

The monitoring plan for each of the three spring sites will be dependent upon the results of the drilling and piezometer/well completion activities. Up to 12 transducer/dataloggers may be installed in the piezometers/wells and set to automatically record electronic water level data at appropriate time intervals. A determination of how many and which piezometer/wells will be electronically monitored will be dependent upon the results of the drilling. If no water is encountered in the Pines 105 and/or Joes Mill Pond area, there may be no need for immediate placement of transducers in any of the holes. Assuming water is present at these locations, up to three transducers with data loggers could be installed in piezometers/wells at Pines 105 and two at the Joes Mill Pond location. Approximately seven transducer/dataloggers may be installed in the piezometers/wells in the Pines 310 and 311 area. Four of the devices will be placed in the "twinned" holes located adjacent to the two bedrock/alluvial springs. The remaining three may be placed in selected piezometers completed in the alluvium parallel to the channel axis.

The electronic water level data will be downloaded from the dataloggers bi-monthly through November 2006 or for as long as wells are safely accessible. Water levels in

the piezometers/wells without transducers will be measured on the same bi-monthly schedule and for the same duration. If feasible, the transducers will remain in-place through the winter and the data loggers downloaded when safely accessible in the Spring of 2007. Further monitoring needs or the need for a monitoring plan change will be assessed at that time.

#### Reclamation of Piezometers/Wells and Access Routes

Sufco anticipates leaving the piezometers in place for at least 2 years. The actual length of time the piezometers are in-place will be dependent upon the presence or absence of water and the type of mitigation required at the sites. The piezometers could be left in place several years after mitigation construction is completed to determine the effectiveness of the mitigation techniques. Of course, if the wells are part of the mitigation process, they may remain in-place indefinitely.

When the piezometers are deemed to no longer be needed, they will be abandoned using one of two methods. The PVC casing will either be pulled from the ground using a portable jack and the remaining hole backfilled with grout, or the PVC will be backfilled with a neat cement grout to within one-foot of the ground surface. The PVC will then be cutoff and the remaining hole filled with native soils. The wells will be abandoned by filling the casing with a neat cement grout to within one foot of the ground surface and cutting the well casing off at that elevation. The concrete surface pad will be removed and the remaining hole backfilled and compacted with native soils. All remaining surface casing associated with both the piezometers and wells will be removed from the area.

The access trails used by the auger rig will be reclaimed where necessary by hand raking to refill any ruts or trenches created by the rig tires. It is assumed this will only occur in sandy areas of the canyon slopes or within soft areas in the spring areas. To combat the potential for deep rutting in the canyon bottoms in wet areas, plywood or other suitable materials may be used as temporary matting. This material will be removed from the area as soon as drilling is complete.

#### Analysis and Reporting

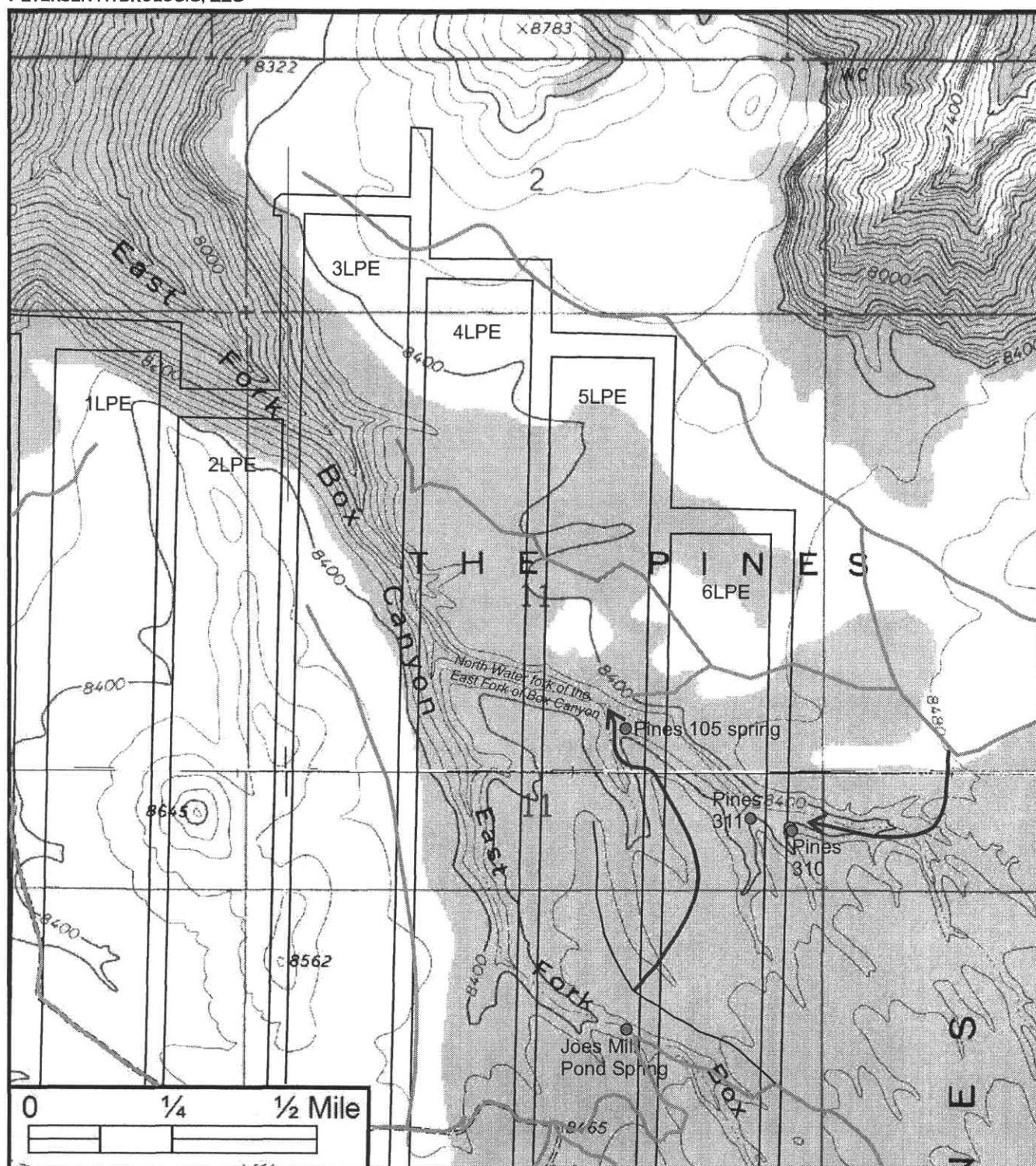
Water level data collected from the completed piezometers and wells will be compiled and reduced to elevation above mean sea level. The elevation data will be used to determine groundwater surface gradients, flow directions, and impacts, if any, to the groundwater as the 6LPE panel is mined in the fall of 2006 and subsequent subsidence. Soils data obtained during the drilling process will be used to evaluate the physical characteristics of the alluvium, such as composition, compaction, thickness, etc. Additionally, if feasible, slug tests or pumping tests may be conducted on completed wells to determine the hydraulic conductivity of the sediments.

The water level data, soils data, and hydraulic conductivity data will be used to determine the mitigation measures that may be employed in the spring areas or to determine if additional drilling work is needed to determine the best mitigation measures. A report detailing the results of the drilling and piezometer/well installation and completion will be submitted to the Utah Division of Oil, Gas and Mining by the end of



October 2006. Water level data collected from the piezometers/wells will be reported to the Division electronically within two weeks after the end of each month through December of 2006. The Division will also be notified within three days via e-mail or telephone conversation/message of significant changes to ground water elevations in the Pines 310, 311 and 105 spring areas as the longwall moves under the area during the Fall of 2006. A report compiling the water level data and interpretation of the data will be submitted to the Division by the end of January 2007.

## FIGURES



● Spring location

— Existing Forest road



Potential drilling access route

— Closed Forest road

Figure 1 Locations of springs and longwall mining panels in the North Water and Joes Mill areas.

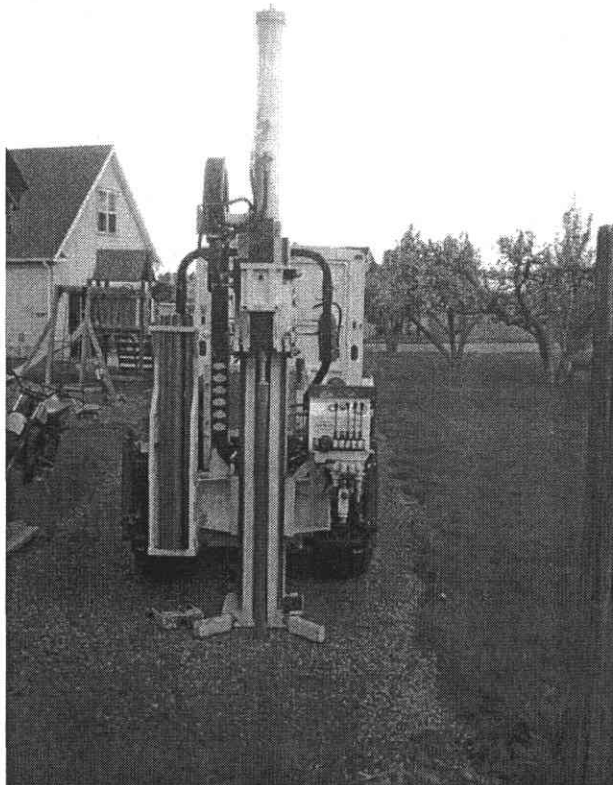
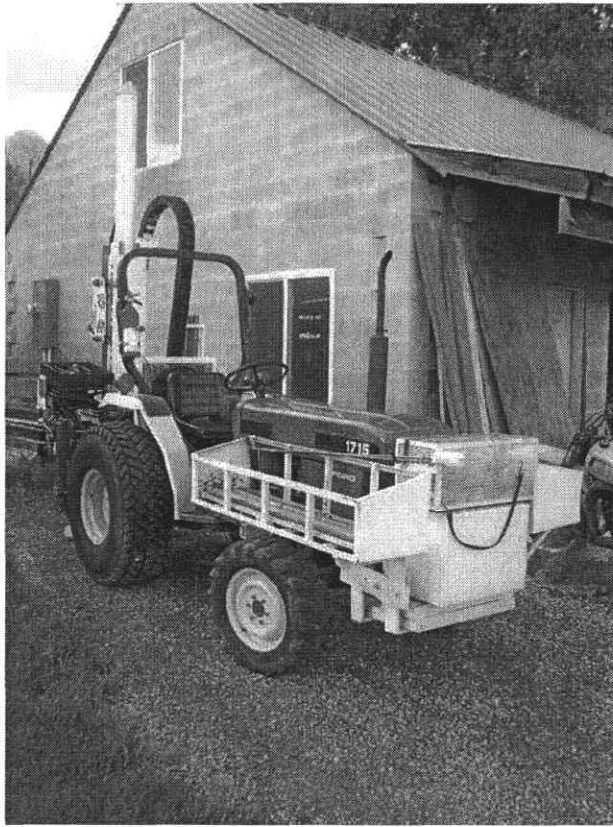


Figure 2 Tractor-mounted drilling rig proposed for use in the Pines 105, Pines 310/311, and Joes Mill Pond areas.

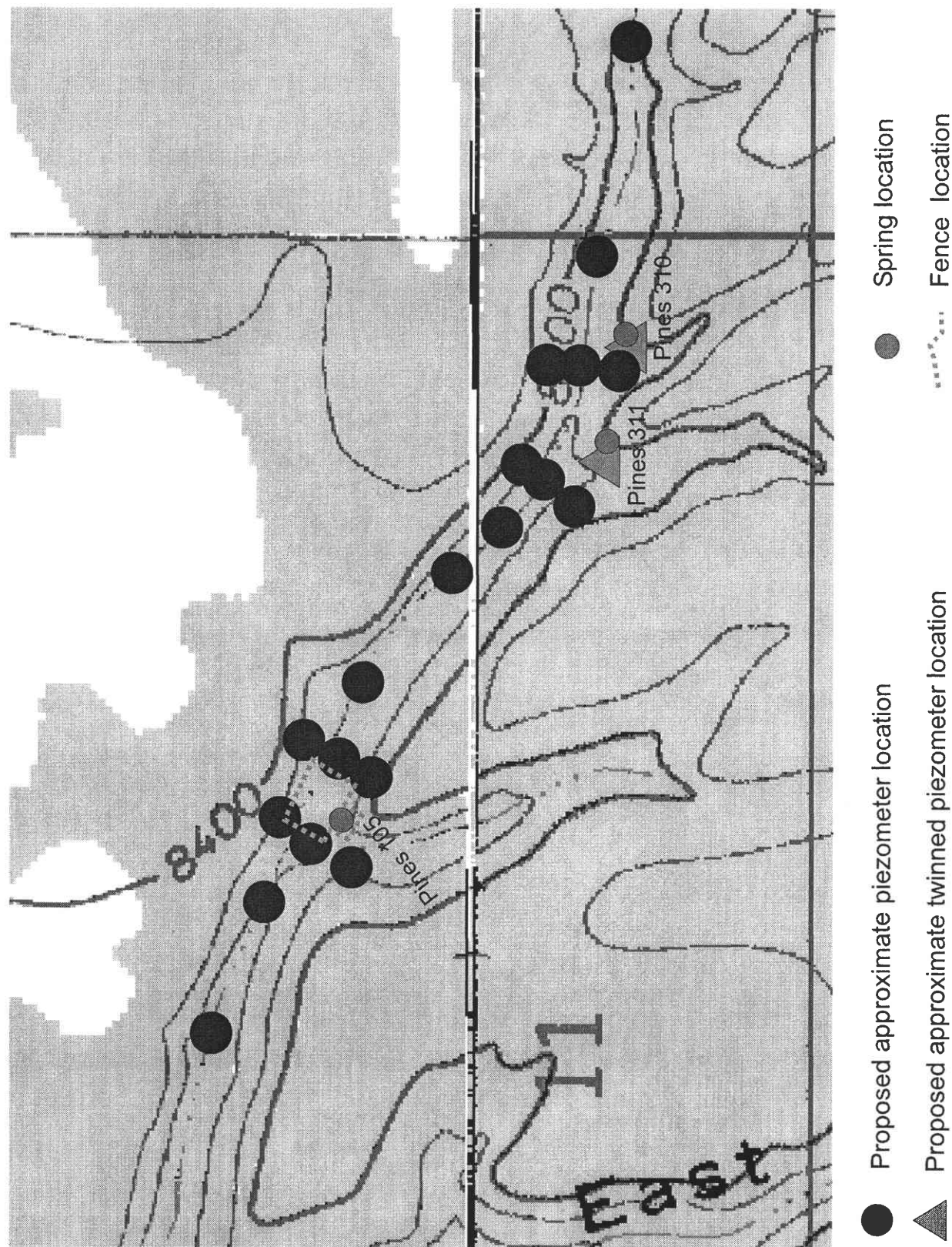


Figure 3 Proposed well locations in the Pines 105 and Pines 310/311 areas.



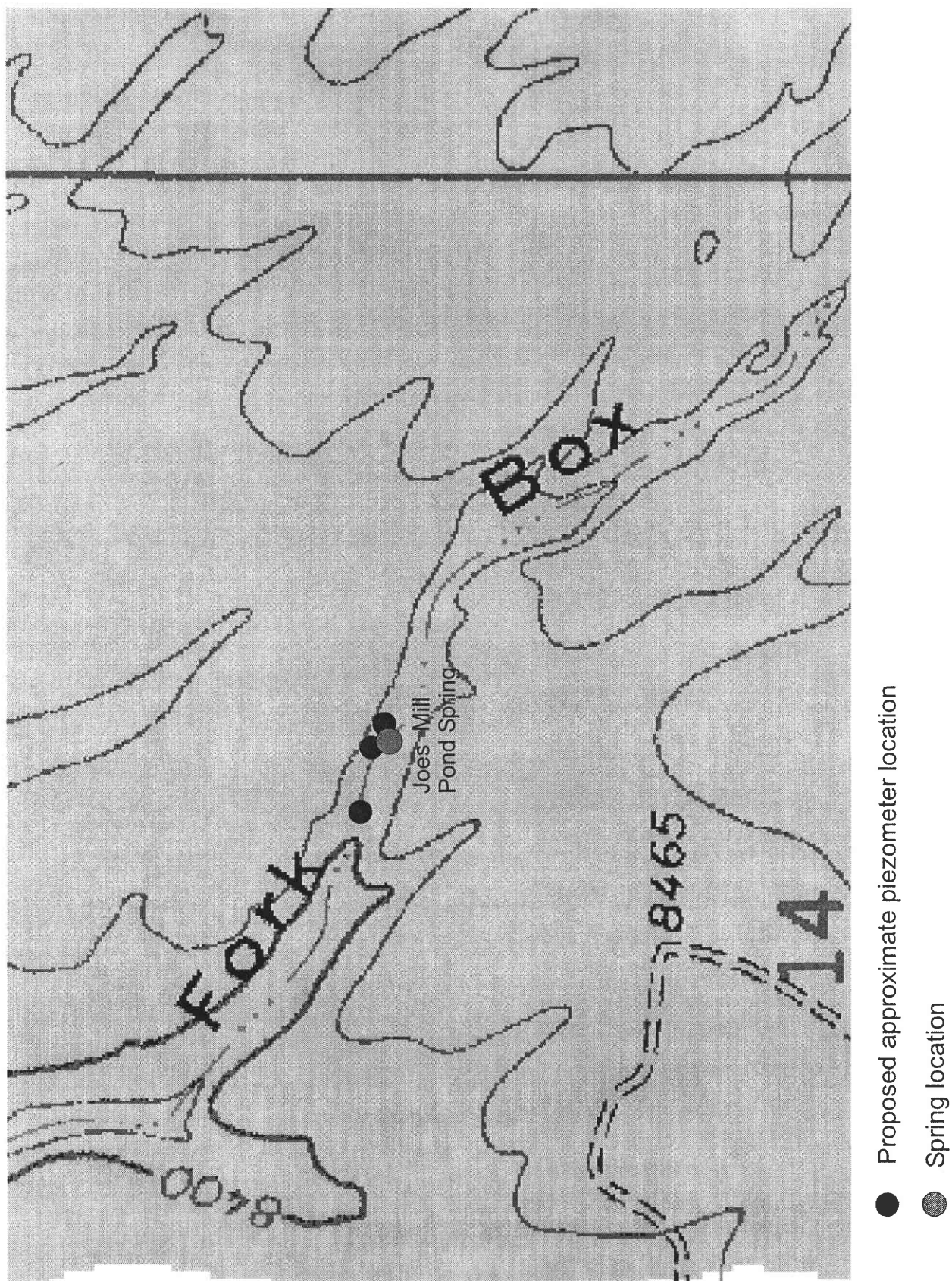


Figure 4 Proposed well locations in the Joes Mill Pond area.